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(54) **FIN MEMBERS TO GUIDE FLUID**

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(57)

ABSTRACT

A fluid applicator mounting device includes a main body to removeably receive a fluid applicator module. The main body includes a common fluid channel having a main input port, a main output port, a supplemental input port to provide fluid to the fluid applicator module, and a supplemental output port to output fluid from the fluid applicator module. The fluid applicator mounting device also includes an input fin member disposed inside the common fluid channel and arranged proximate to the supplemental input port to guide fluid to the fluid applicator module. The fluid applicator mounting device also includes an output fin member disposed inside the common fluid channel and arranged proximate to the supplemental output port to guide fluid from the fluid applicator module away from the supplemental output port.

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(52) **U.S. Cl.**

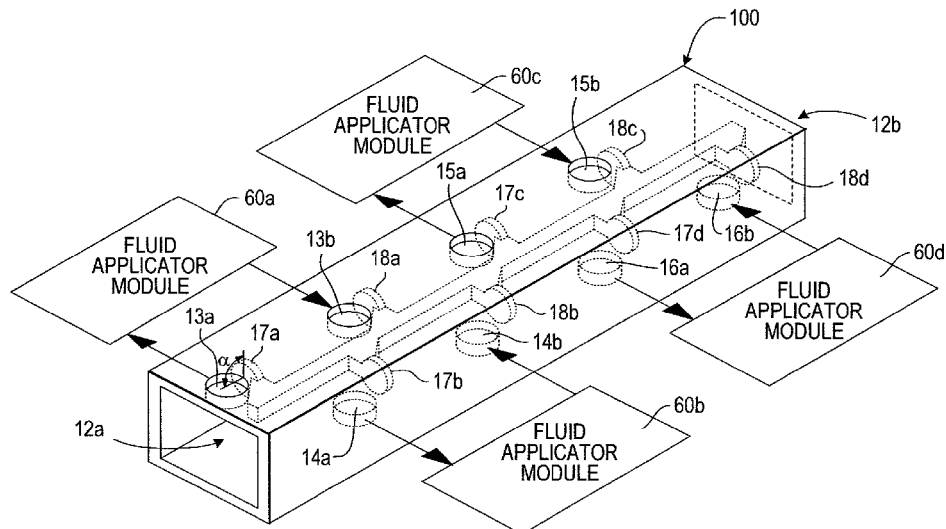
CPC .. **B41J 2/175** (2013.01); **B41J 2/18** (2013.01);
B41J 2202/12 (2013.01); **B41J 2202/20**
(2013.01)

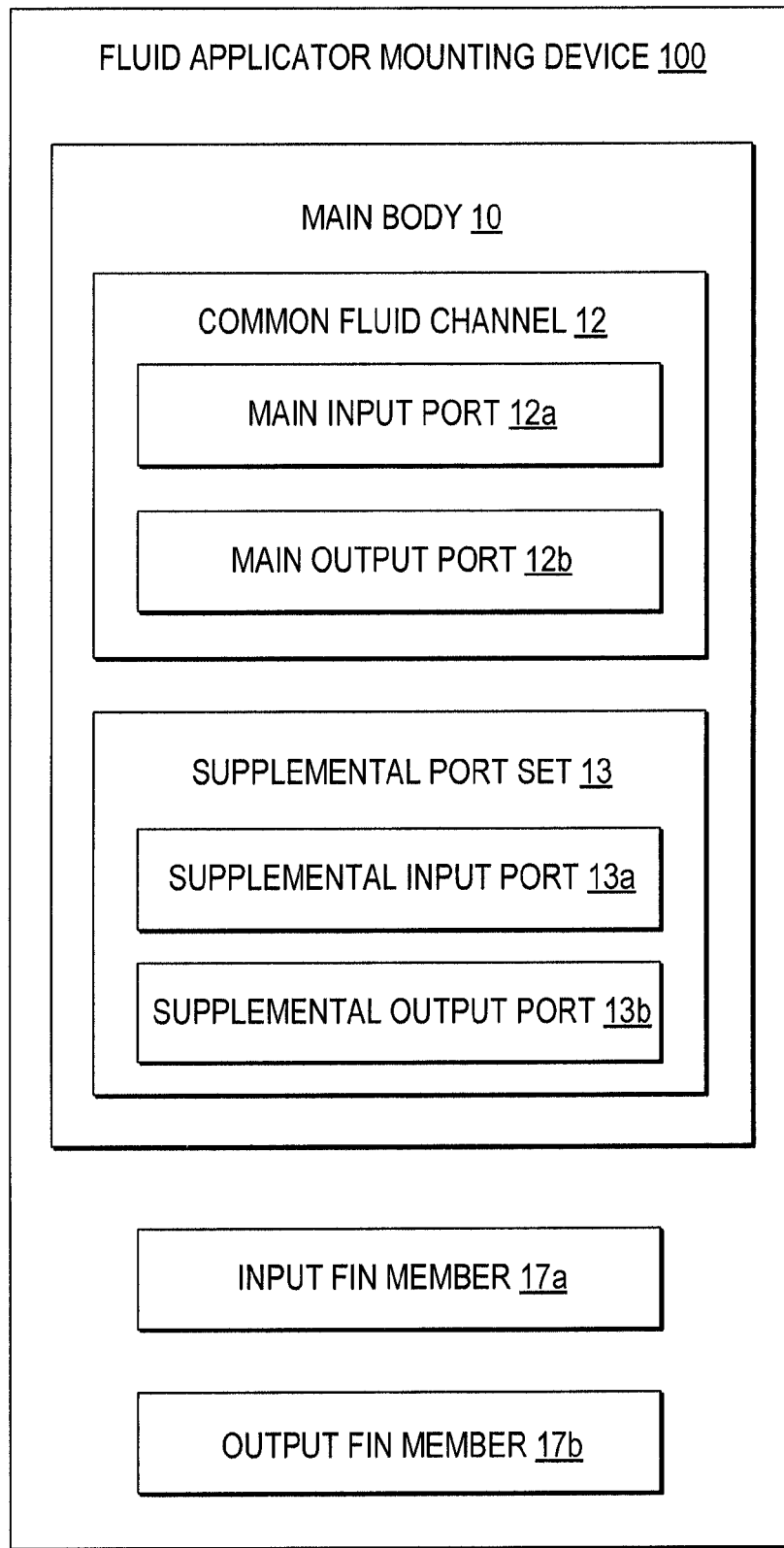
(58) **Field of Classification Search**

CPC **B41J 2202/20**

USPC **347/40**

See application file for complete search history.



*Fig. 1*

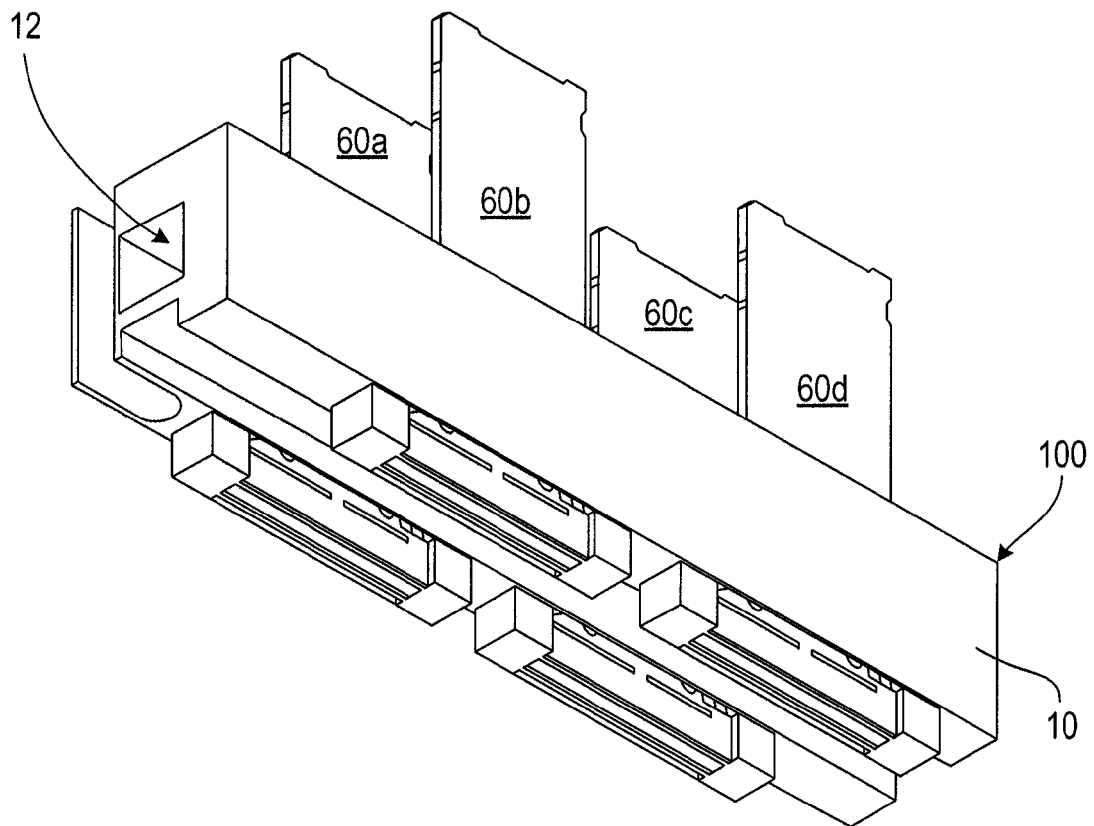


Fig. 2

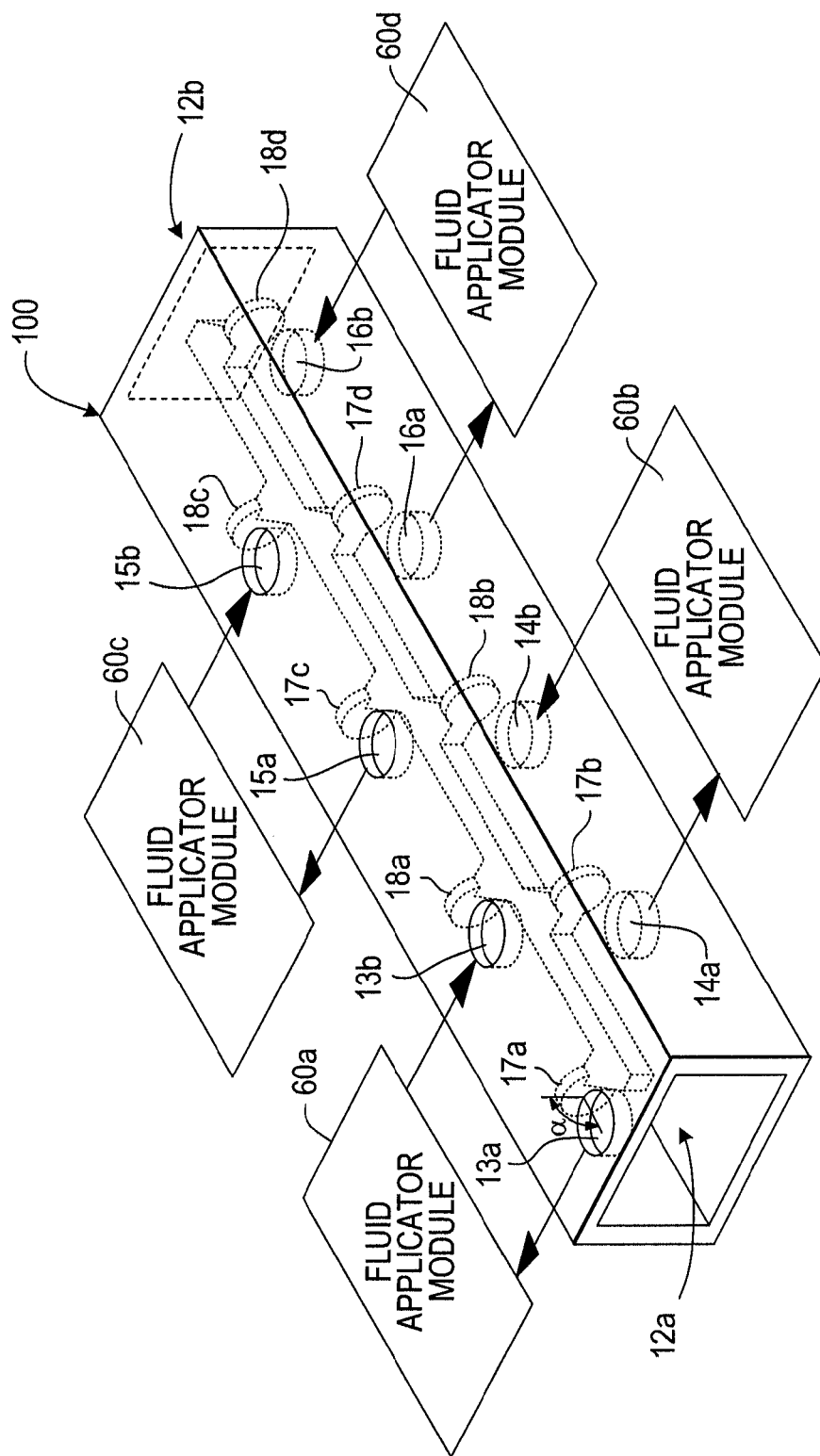


Fig. 3

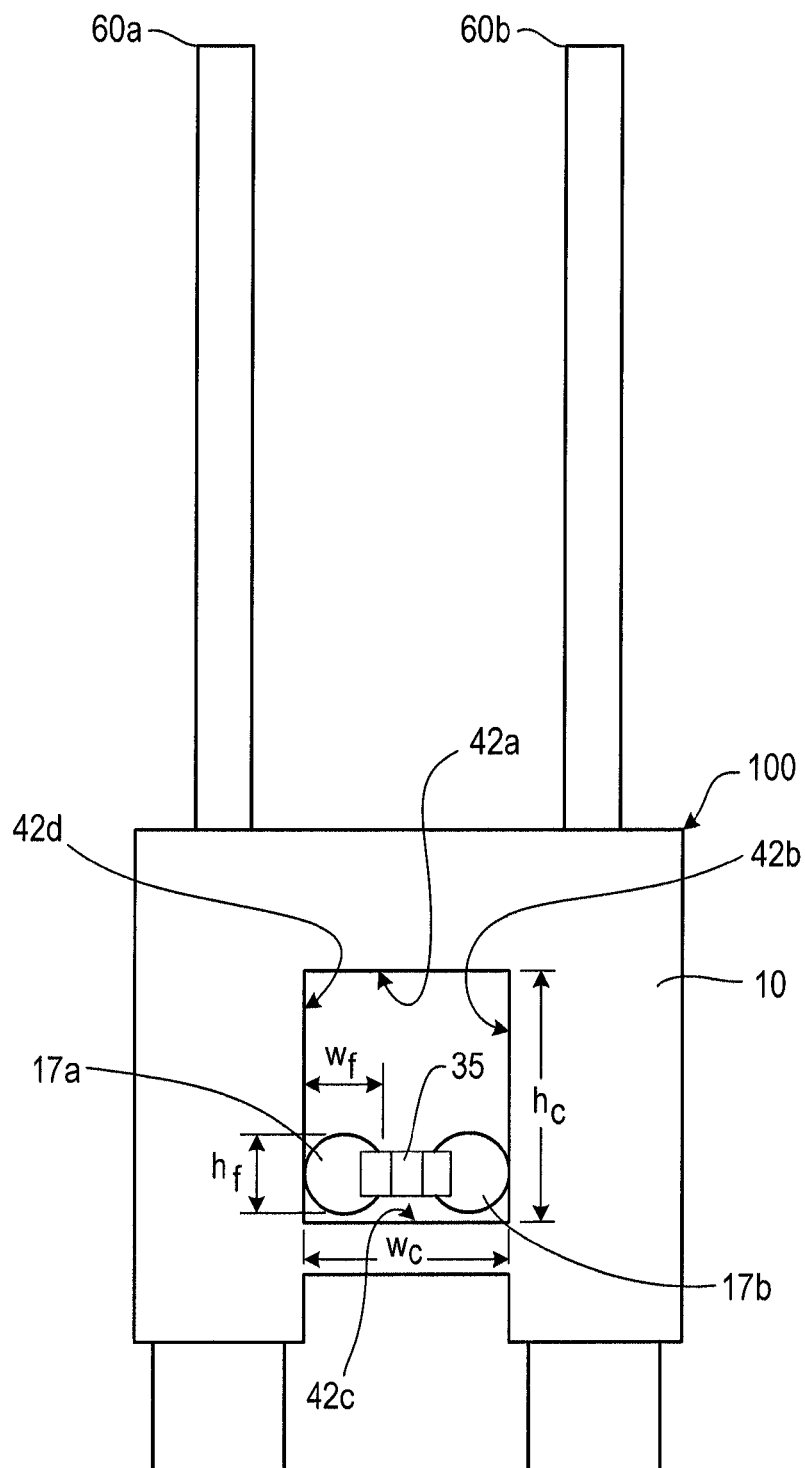


Fig. 4

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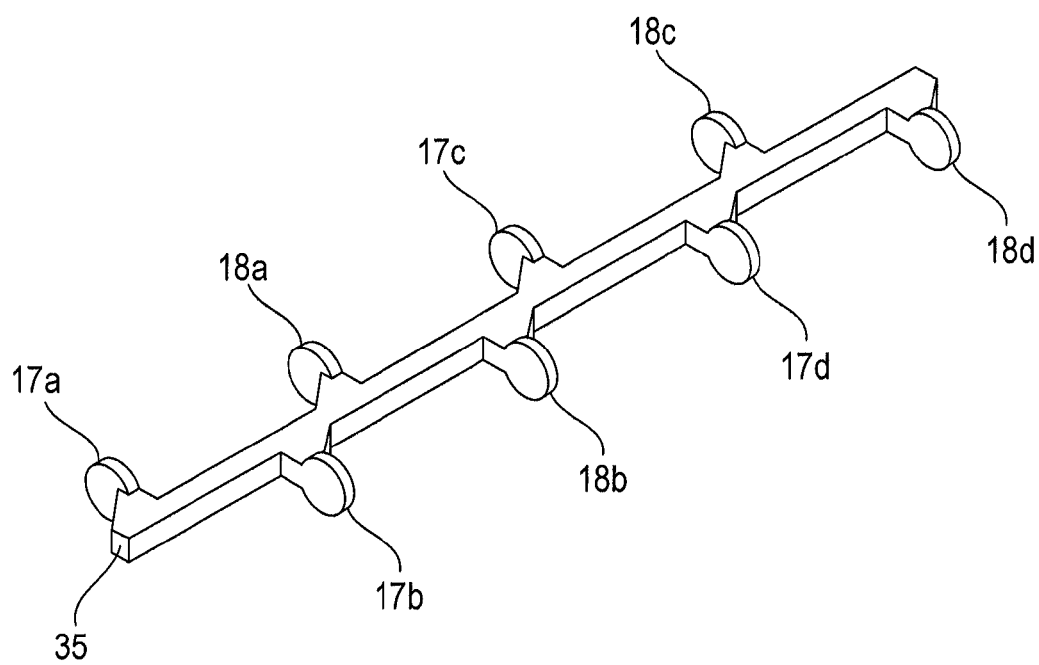
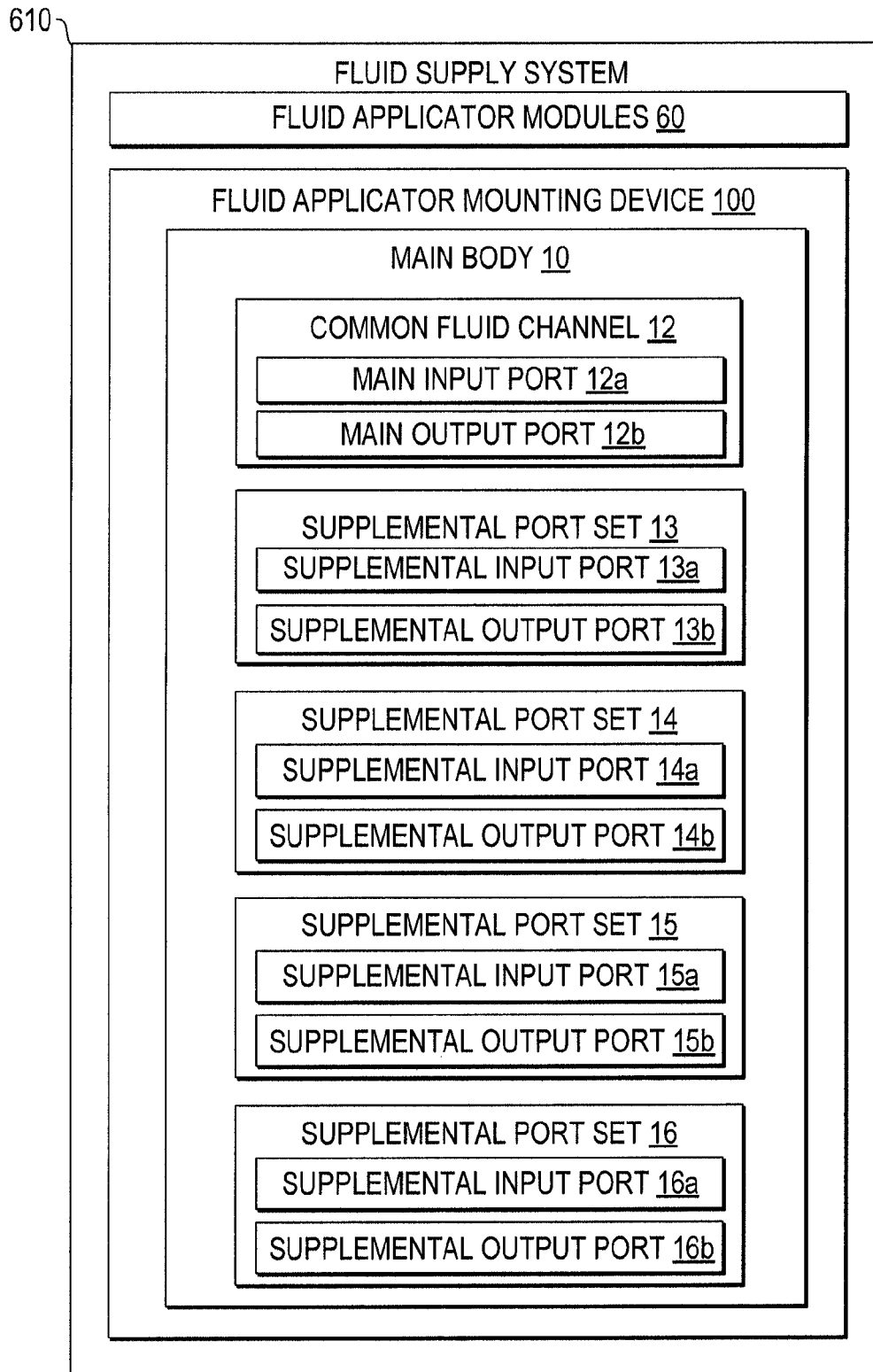
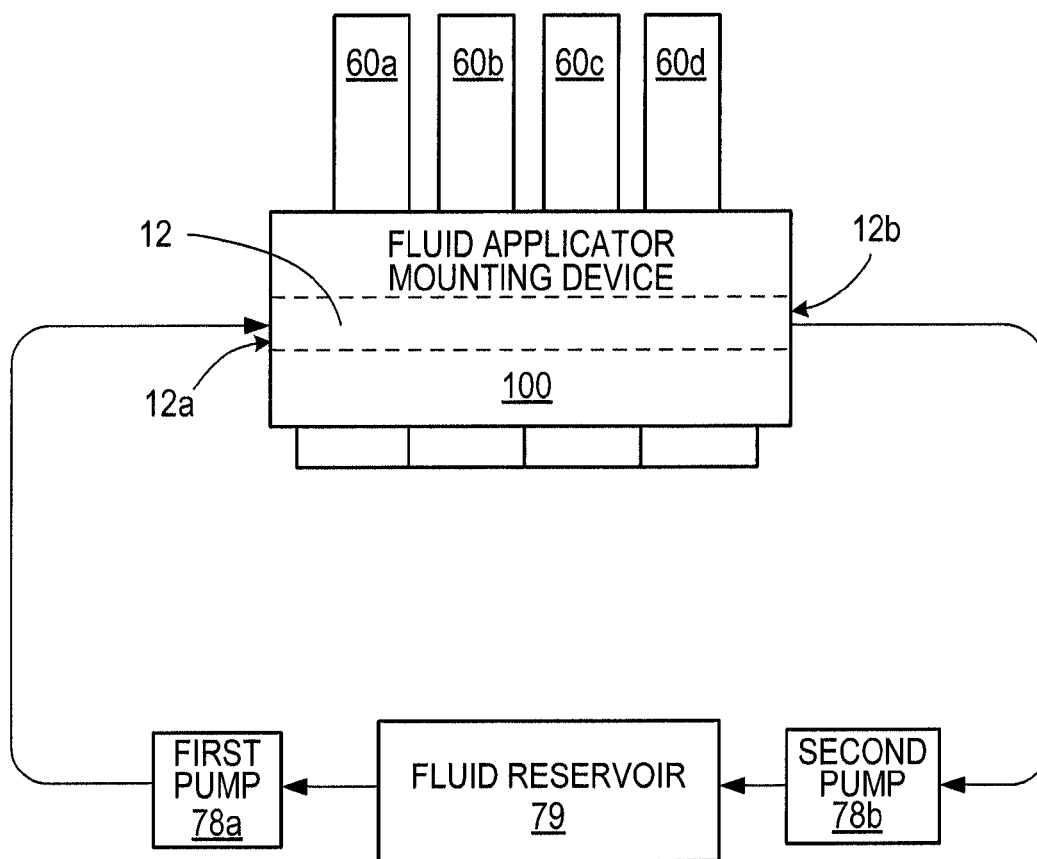


Fig. 5

*Fig. 6*

610*Fig. 7*

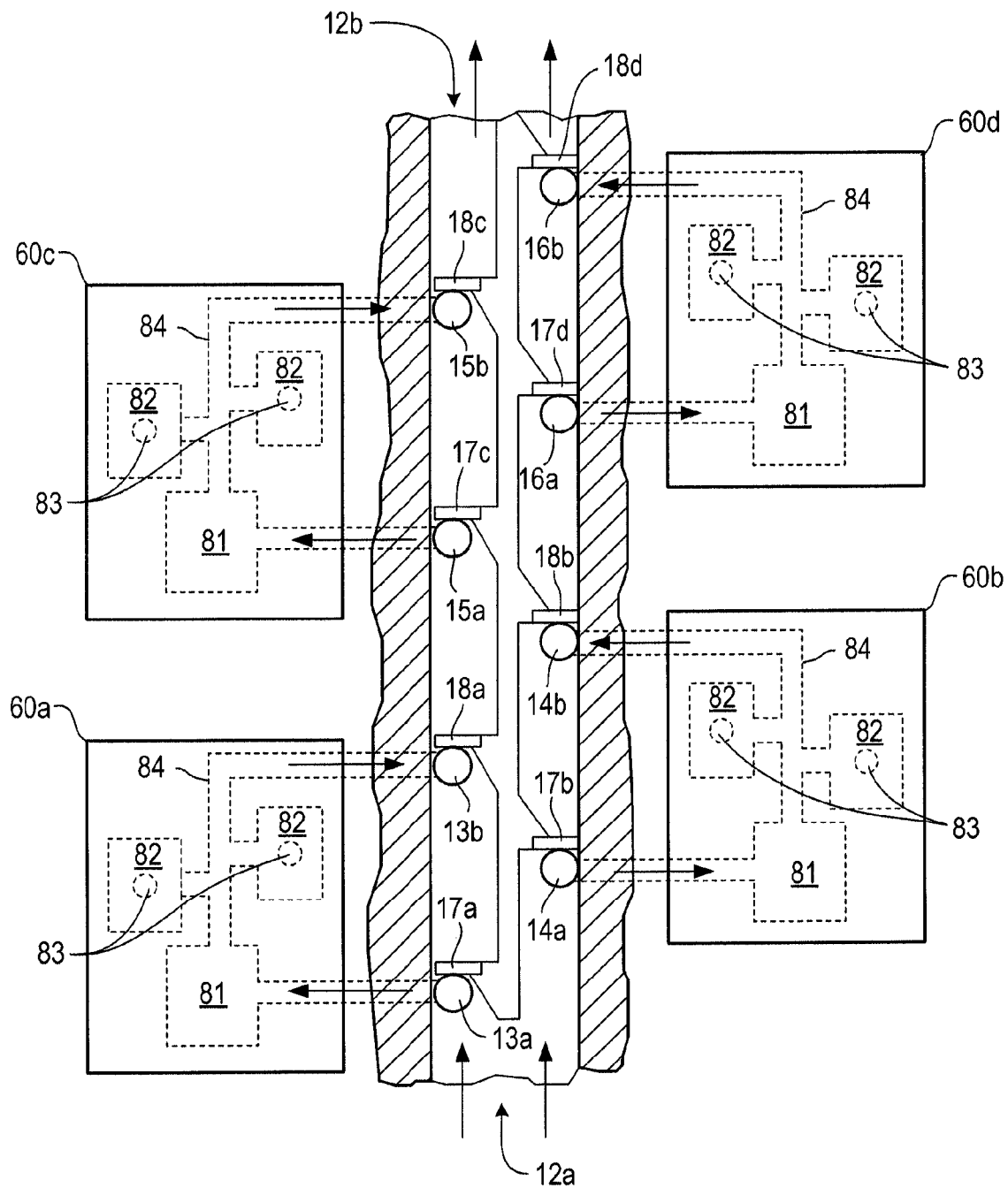
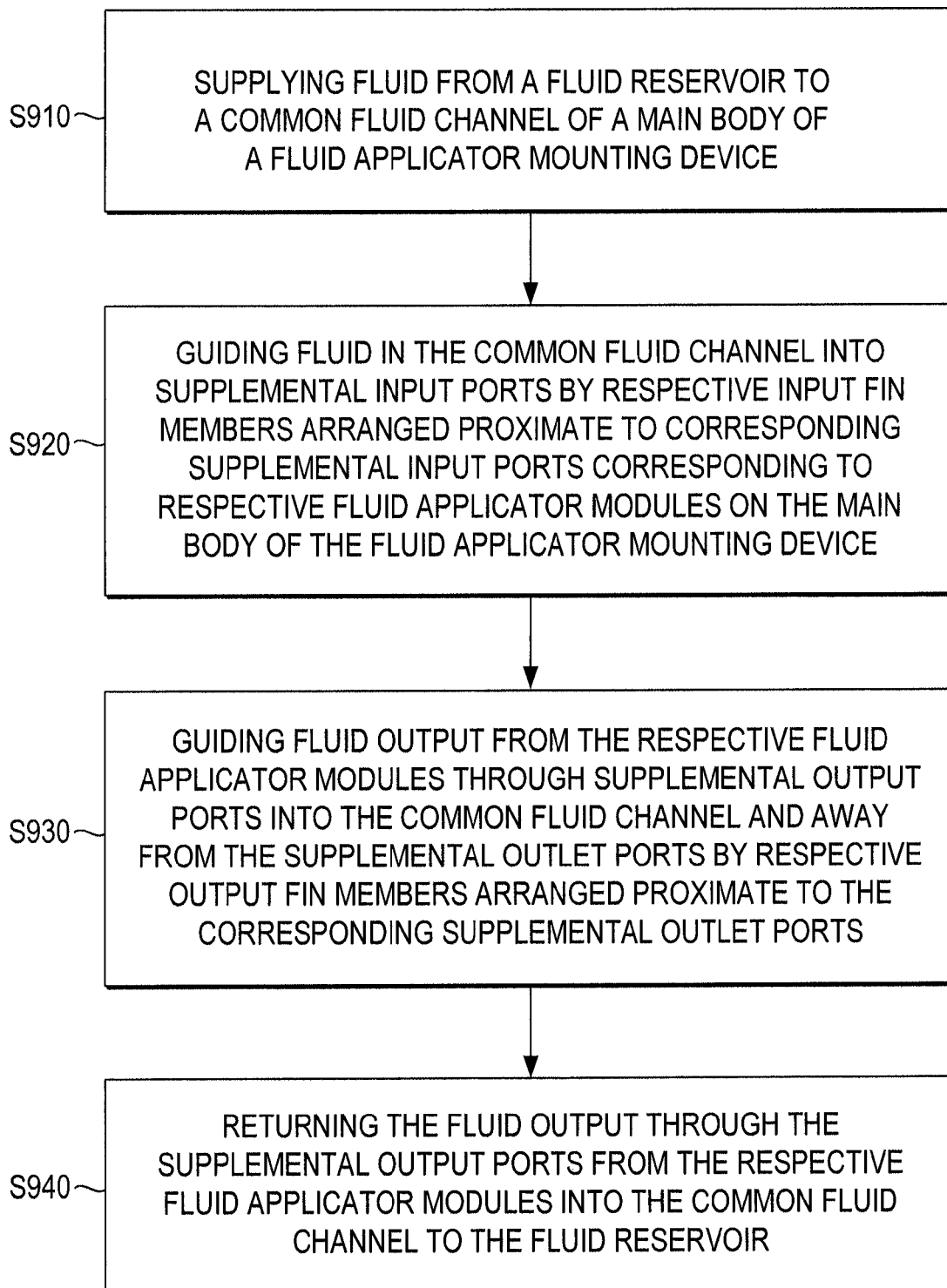


Fig. 8

*Fig. 9*

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FIN MEMBERS TO GUIDE FLUID

BACKGROUND

Fluid applicator mounting devices may removeably receive fluid applicator modules. The fluid applicator modules may selectively apply fluid to an object. The fluid applicator mounting device may include a common supply channel to supply fluid to the fluid applicator modules. The fluid applicator modules may include printhead modules, or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

Non-limiting examples of the present disclosure are described in the following description, read with reference to the figures attached hereto and do not limit the scope of the claims. In the figures, identical and similar structures, elements or parts thereof that appear in more than one figure are generally labeled with the same or similar references in the figures in which they appear. Dimensions of components, layers, substrates and features illustrated in the figures are chosen primarily for convenience and clarity of presentation and are not necessarily to scale. Referring to the attached figures:

FIG. 1 is a block diagram illustrating a fluid applicator mounting device according to an example.

FIG. 2 is a perspective view illustrating the fluid applicator mounting device of FIG. 1 with fluid applicator modules mounted thereto according to an example.

FIG. 3 is a schematic view illustrating the common fluid channel of the fluid applicator mounting device of FIG. 2 in communication with fluid applicator modules according to an example.

FIG. 4 is a cross-sectional view illustrating the fluid applicator mounting device of FIG. 2 according to an example.

FIG. 5 is a perspective view illustrating a single fin unit of the fluid applicator mounting device of FIG. 2 according to an example.

FIG. 6 is a block diagram illustrating a fluid supply system to supply fluid to fluid applicator modules according to an example.

FIG. 7 is a schematic diagram illustrating the fluid supply system of FIG. 6 according to an example.

FIG. 8 is a schematic diagram illustrating a portion of the fluid supply system of FIG. 7 according to an example.

FIG. 9 is a flowchart illustrating a method of supplying fluid to fluid applicator modules according to an example.

DETAILED DESCRIPTION

Fluid applicator mounting devices may removeably receive fluid applicator modules. The fluid applicator modules may selectively apply fluid to an object. The fluid applicator mounting device may include a channel to supply fluid to the fluid applicator modules. The fluid applicator modules may include printhead modules, or the like. Fluid such as pigmented ink having solid pigment particles may be supplied, for example, to an array of inkjet printhead modules removeably mounted on the fluid applicator mounting device. As pigment particles may tend to precipitate and agglomerate, the pigmented ink may be continuously supplied to the fluid applicator modules to stir the pigmented ink. However, a large amount of pigment ink may remain in the fluid applicator modules without being recirculated out and in thereof (e.g., refreshed). Thus, pigmented particles may precipitate within the fluid applicator modules, obstruct fluid delivery

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and cause nozzle malfunction resulting in reducing performance of the fluid applicator modules.

In examples, a fluid applicator mounting device includes, among other things, a main input port, a main output port, an input fin member, and an output fin member disposed in a common fluid channel. The main input port may receive fluid from the fluid reservoir. The input fin member may be arranged proximate to a supplemental input port to guide fluid to a respective fluid applicator module. The output fin member may be arranged proximate to a supplemental output port to guide fluid from the respective fluid applicator module away from the supplemental output port. The main output port may output fluid from the common fluid channel to be returned to the fluid reservoir. Respective fin members to direct fluid into and out of the fluid applicator modules may reduce the amount of fluid remaining in the fluid applicator modules without being refreshed. Consequently, undesirable precipitation of fluid within the fluid applicator modules, obstruction of fluid delivery, and nozzle malfunction may be reduced.

FIG. 1 is a block diagram illustrating a fluid applicator mounting device according to an example. Referring to FIG. 1, in some examples, a fluid applicator mounting device 100 includes a main body 10 to removeably receive a fluid applicator module 60a (FIG. 2), an input fin member 17a, and an output fin member 18a. The main body 10 may include a common fluid channel 12 extending therein, and a supplemental port set 13. The supplemental port set 13 may include a supplemental input port 13a and a supplemental output port 13b corresponding to a respective fluid applicator module 60a. The common fluid channel 12 may include a main input port 12a to receive fluid from a fluid reservoir and a main output port 12b to return fluid to the fluid reservoir. The supplemental input port 13a may provide fluid from the common fluid channel 12 to the fluid applicator module 60a. The supplemental output port 13b may output fluid from the fluid applicator module 60a to the common fluid channel 12.

Referring to FIG. 1, in some examples, the input fin member may be disposed inside the common fluid channel 12 and arranged proximate to the supplemental input port 13a to guide fluid to the fluid applicator module 60a. The output fin member 18a may be disposed inside the common fluid channel 12 and arranged proximate to the supplemental output port 13b to guide fluid from the fluid applicator module 60a away from the supplemental output port 13b. That is, the fluid may be directed into the common fluid channel 12 to be subsequently output through the main output port 12b from the common fluid channel 12.

FIG. 2 is a perspective view illustrating the fluid applicator mounting device of FIG. 1 with fluid applicator modules mounted thereto according to an example. FIG. 3 is a schematic view illustrating the common fluid channel of the fluid applicator mounting device of FIG. 2 in communication with fluid applicator modules according to an example. FIG. 4 is a cross-sectional view illustrating the fluid applicator mounting device of FIG. 2 according to an example. Referring to FIGS. 2-4, in some examples, a fluid applicator mounting device 100 may include a common fluid channel 12 including a plurality of walls 42a, 42b, 42c and 42d intersecting with each other. The common fluid channel 12 may also include a channel height h_c and a channel width w_c . That is, the channel height h_c and the channel width w_c may correspond to a cross-sectional space of the common fluid channel 12 for fluid to flow there through. The shape of the common fluid channel 12 may be substantially rectangular, or the like. In some examples, the fluid may be a pigmented fluid such as pigmented ink.

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In some examples, the fluid applicator module **60a** may be a printhead module, or the like. For example, the fluid applicator module **60a** may include an inkjet printhead module. The inkjet printhead module may include a silicon micro-machined chip, or the like. In some examples, a large format printing system may include printhead arrays including a plurality of inkjet printhead modules mounted to the fluid applicator mounting device **100** and extending across a media transport path.

Referring to FIGS. 3 and 4, in some examples, the input fin member **17a** and the output fin member **18a** may have a fin height h_f less than the channel height h_c and a fin width w_f less than the channel width w_c . A shape of the input fin member **17a** and the output fin member **18a** may be substantially circular, substantially rectangular, or the like. In some examples, the input fin member **17a** and the output fin member **18a** may be arranged substantially perpendicular to at least one of the walls **42a**, **42b**, **42c**, and **42d**. For example, the input fin member **17a** and the output fin member **18a** may be substantially perpendicular to a wall **42c** in which the supplemental input port **13a** and the supplemental output port **13b** are disposed. That is, each one of the respective fin members **17a** and **18a** may form an angle α of substantially ninety degrees with the respective wall **42c**. In some examples, the input fin member **17a** and the output fin member **18a** are substantially perpendicular to each one of the walls **42a**, **42b**, **42c**, and **42d**. In some examples, the main body **10** may include a plurality of supplemental input ports **13a**, **14a**, **15a**, and **16a** and a plurality of supplemental output ports **13b**, **14b**, **15b**, and **16b**.

FIG. 5 is a perspective view illustrating a single fin unit of the fluid applicator mounting device of FIG. 2 according to an example. Referring to FIG. 5, a fluid applicator mounting device **100** may also include a single fin unit **55**. The single fin unit **55** may include a fin carrier member **35**, an input fin member **17a**, and an output fin member **18a**. The input fin member **17a** and the output fin member **18a** may be coupled to the fin carrier member **35** and extend outward d_o therefrom. The fin carrier member **35** may include a plurality of input fin members **17a**, **17b**, **17c**, and **17d** and output fin members **18a**, **18b**, **18c**, and **18d** coupled thereto. For example, the plurality of input fin members **17a**, **17b**, **17c**, and **17d** and output fin members **18a**, **18b**, **18c**, and **18d** may be arranged proximate to corresponding supplemental input ports **13a**, **14a**, **15a**, and **16a** and supplemental output ports **13b**, **14b**, **15b**, and **16b**. In some examples, the respective fin members **17a-18b** may be adjusted and on a downstream side with respect to the fluid flow in the common fluid channel **12** of the corresponding supplemental ports **13a-16b**. The single fin unit **55** may be removeably disposed inside the common fluid channel **12**.

FIG. 6 is a block diagram illustrating a fluid supply system to supply fluid to fluid applicator modules according to an example. Referring to FIG. 6, in some examples, a fluid supply system **610** may include fluid applicator modules **60** to apply fluid onto objects such as media and a fluid applicator mounting device **100** to receive the fluid applicator modules **60**. The fluid applicator mounting device **100** may include a main body **10** including a common fluid channel **12** therein, supplemental port sets **13**, **14**, **15**, and **16**, input fin members **17**, and output fin members **18**. The common fluid channel **12** may include a main input port **12a** to receive fluid from a fluid reservoir and a main output port **12b** to return fluid to the fluid reservoir. The supplemental port sets **13**, **14**, **15**, and **16** may correspond to the fluid applicator modules **60**, respectively. Each supplemental port set **13** may include a supplemental input port **13a** to provide fluid to the corresponding fluid

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applicator module **60a** and a supplemental output port **13b** to output fluid from the corresponding fluid applicator module **60a**.

Referring to FIG. 6, in some examples, the input fin members **17** and the output fin members **18** may be disposed in the common fluid channel **12**. Each input fin member **17** may be arranged proximate to a corresponding supplemental input port **13a**, **14a**, **15a**, and **16a** to guide fluid to the respective fluid applicator module **60**. Each output fin member **18** may be arranged proximate to a corresponding supplemental output port **13b**, **14b**, **15b**, and **16b** to guide fluid from the respective fluid applicator module **60** away from the corresponding supplemental output port **13b**, **14b**, **15b**, and **16b**. That is, the fluid may be directed into the common fluid channel **12** to be subsequently output through the main output port **12b** from the common fluid channel **12**.

In some examples, the fluid applicator mounting device **100** of FIG. 6 may correspond to the fluid applicator mounting device **100** previously disclosed with respect to FIGS. 1-5. For example, the common fluid channel **12** may include a plurality of walls **42a**, **42b**, **42c**, and **42d** intersecting with each other to form the common fluid channel **12** having a channel height h_c and a channel width w_c . The fluid supply system **610** may also include a fin carrier member **35** coupled to the input fin members **17** and the output fin members **18** extending outward d_o from the fin carrier member **35** to form a single fin unit **55**. The single fin unit **55** may be removeably disposed inside the common fluid channel **12**. The input fin members **17** and the output fin members **18** may have a fin height h_f less than the channel height h_c and a fin width w_f less than the channel width w_c . A shape of the input fin members **17** and the output fin members **18** may be at least one of substantially circular and substantially rectangular. The input fin members **17** and the output fin members **18** may be arranged substantially perpendicular to at least one of the walls **42a**, **42b**, **42c**, and **42d**. For example, the input fin members **17** and the output fin members **18** may be substantially perpendicular to a wall **42c** in which the supplemental input ports **13a**, **14a**, **15a**, and **16a** and the supplemental output ports **13b**, **14b**, **15b**, and **16b** are disposed. In some examples, the input fin members **17** and the output fin members **18** are substantially perpendicular to each one of the walls **42a**, **42b**, **42c**, and **42d**.

FIG. 7 is a schematic diagram illustrating the fluid supply system of FIG. 6 according to an example. Referring to FIG. 7, a fluid supply system **610** may also include at least one pump **78a** and **78b** to transport fluid between a fluid reservoir **79** and the fluid applicator modules **60a**, **60b**, **60c**, and **60d**. For example, a first pump **78a** may be disposed between the fluid reservoir **79** and the fluid applicator mounting device **100** to pump fluid from the fluid reservoir **79** to the fluid applicator mounting device **100**. That is, fluid may be transported from the fluid reservoir **79** through the first pump **78a** to the main input port **12a** of the common fluid channel **12** of the fluid applicator mounting device **100**. Additionally, a second pump **78b** may be disposed between the fluid reservoir **79** and the fluid applicator mounting device **100** to pump fluid from the fluid applicator mounting device **100** to the fluid reservoir **79**. That is, fluid is transported from the main output port **12b** of the common fluid channel **12** of the fluid applicator mounting device **100** through the second pump **78b** to the fluid reservoir **79**. In some examples, fluid may be continuously transported and/or periodically transported in predetermined amounts between the fluid reservoir **79**, the common fluid channel **12**, and the fluid applicator modules **60a**, **60b**, **60c**, and **60d**.

FIG. 8 is a schematic diagram illustrating a portion of the fluid supply system of FIG. 7 according to an example. Referring to FIGS. 7-8, in some examples, fluid may circulate between the fluid reservoir 79 and the fluid applicator modules 60a, 60b, 60c, and 60d. That is, fluid may flow from the fluid reservoir 79 into the main input port 12a of the common fluid channel 12. In the common fluid channel 12, the fluid may be directed by input fin members 17 into corresponding supplemental input ports 17a, 17b, 17c, and 17d corresponding to fluid applicator modules 60a, 60b, 60c, and 60d. In some examples, inside the respective fluid applicator modules 60a, 60b, 60c, and 60d such as printhead modules, a respective supply channel 84 may receive the fluid from the respective supplemental input port 13a, 14a, 15a, and 16a to supply the fluid to a fluid chamber 81 and ejection chambers 82 of the respective fluid applicator modules 60a, 60b, 60c, and 60d. Fluid from the respective ejection chambers 82 may be selectively ejected there from by an ejection member (not illustrated) through a corresponding nozzle 83 on an object such as media. Each one of the fluid applicator modules 60a, 60b, 60c, and 60d may include many ejection chambers 82 and corresponding nozzles 83. Fluid from the respective fluid chamber 81 may replenish the fluid ejected from the respective ejection chambers 82 thereto.

Referring to FIG. 8, in some examples, the fluid not presently ejected from the respective ejection chambers 82 may flow out of the respective fluid applicator modules 60a, 60b, 60c, and 60d to be replaced by fluid reentering the respective fluid applicator modules 60a, 60b, 60c, and 60d. For example, the non-ejected fluid may flow through the respective supply channel 84 in fluid communication with the respective supplemental output ports 13b, 14b, 15b, and 16b and into the common fluid channel 12. In the common fluid channel 12, fluid may be directed away from the corresponding supplemental output ports 13b, 14b, 15b, and 16b by respective output fin members 18a, 18b, 18c, and 18d. The fluid may continue downstream in the common fluid channel 12 and be directed by respective input fin members 17c and 17d into and by respective output fin members 18c and 18d out of fluid applicator modules 60c and 60d disposed downstream from the previously-supplied fluid applicator modules 60a and 60b upstream there from in which the fluid exited.

For example, referring to FIG. 8, fluid applicator modules 60a and 60c may be arranged in a first printhead array in which fluid exiting from fluid applicator module 60a may enter into fluid applicator module 60c downstream there from. Additionally, fluid applicator modules 60b and 60d may be arranged in a second printhead array in which fluid exiting from fluid applicator module 60b may enter into fluid applicator module 60d downstream there from. Subsequently, the fluid may flow out of the main output port 12b of the common fluid channel 12 back to the fluid reservoir 79. In some examples, respective fluid applicator modules from the first and second printhead array may be refreshed and/or operated simultaneously.

FIG. 9 is a flowchart illustrating a method of supplying fluid to fluid applicator modules according to an example. Referring to FIG. 9, in block S910, fluid is supplied from a fluid reservoir to a common fluid channel of a main body of a fluid applicator mounting device. For example, the fluid from the fluid reservoir may be input through a main input port to the common fluid channel. In some examples, the fluid applicator modules may include printhead modules. The printhead modules may be arranged to form a plurality of printhead arrays. In block S920, fluid in the common fluid channel is guided into supplemental input ports by respective input fin members arranged proximate to corresponding supplemental

input ports corresponding to respective fluid applicator modules mounted on the main body of the fluid applicator mounting device. In block S930, fluid output from the respective fluid applicator modules through supplemental output ports into the common fluid channel is guided away from the supplemental output ports by respective output fin members arranged proximate to the corresponding supplemental output ports. That is, the fluid may be directed into the common fluid channel to be subsequently output through the main output port from the common fluid channel.

In some examples, the common fluid channel may be formed by walls intersecting with each other such that the common fluid channel has a channel height and a channel width. The input fin members and the output fin members may have a fin height less than the channel height, a fin width less than the channel width, and be arranged substantially perpendicular to at least one of the walls. In block S940, the fluid output through the supplemental output ports from the respective fluid applicator modules into the common fluid channel is returned to the fluid reservoir. For example, the fluid is output from the common fluid channel through the main output port to the fluid reservoir. In some examples, the fluid is continuously transported between the fluid reservoir, the common fluid channel, and the fluid applicator modules. That is, fluid in the fluid applicator modules not presently ejected therefrom may be returned to the fluid reservoir to, subsequently, be transported back to the fluid applicator modules.

It is to be understood that the flowchart of FIG. 9 illustrates architecture, functionality, and/or operation of an example of the present disclosure. If embodied in software, each block may represent a module, segment, or portion of code that includes one or more executable instructions to implement the specified logical function(s). If embodied in hardware, each block may represent a circuit or a number of interconnected circuits to implement the specified logical function(s). Although the flowchart of FIG. 9 illustrates a specific order of execution, the order of execution may differ from that which is depicted. For example, the order of execution of two or more blocks may be scrambled relative to the order illustrated. Also, two or more blocks illustrated in succession in FIG. 9 may be executed concurrently or with partial concurrence. All such variations are within the scope of the present disclosure.

The present disclosure has been described using non-limiting detailed descriptions of examples thereof and is not intended to limit the scope of the present disclosure. It should be understood that features and/or operations described with respect to one example may be used with other examples and that not all examples of the present disclosure have all of the features and/or operations illustrated in a particular figure or described with respect to one of the examples. Variations of examples described will occur to persons of the art. Furthermore, the terms “comprise,” “include,” “have” and their conjugates, shall mean, when used in the present disclosure and/or claims, “including but not necessarily limited to.”

It is noted that some of the above described examples may include structure, acts or details of structures and acts that may not be essential to the present disclosure and are intended to be exemplary. Structure and acts described herein are replaceable by equivalents, which perform the same function, even if the structure or acts are different, as known in the art. Therefore, the scope of the present disclosure is limited only by the elements and limitations as used in the claims.

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What is claimed is:

1. A fluid applicator mounting device, comprising:
 - a main body to removeably receive a fluid applicator module, the main body including a common fluid channel extending therein having a main input port to receive fluid from a fluid reservoir and a main output port to return fluid to the fluid reservoir, and a supplemental port set;
 - the supplemental port set including a supplemental input port to provide fluid to the fluid applicator module and a supplemental output port to output fluid from the fluid applicator module;
 - an input fin member disposed inside the common fluid channel and arranged proximate to the supplemental input port to guide fluid to the fluid applicator module; and
 - an output fin member disposed inside the common fluid channel and arranged proximate to the supplemental output port to guide fluid from the fluid applicator module away from the supplemental output port.
2. The fluid applicator mounting device according to claim 1, further comprising:
 - a fin carrier member coupled to the input fin member and the output fin member extending outward from the fin carrier member to form a single fin unit, wherein the single fin unit is removeably disposed inside the common fluid channel.
3. The fluid applicator mounting device according to claim 1, further comprising:
 - a plurality of walls intersecting with each other to form the common fluid channel having a channel height and a channel width; and
 - wherein the input fin member and the output fin member have a fin height less than the channel height and a fin width less than the channel width.
4. The fluid applicator mounting device according to claim 3, wherein the input fin member and the output fin member are arranged substantially perpendicular to at least one of the walls.
5. The fluid applicator mounting device according to claim 3, wherein the fluid applicator module is a printhead module.
6. A fluid supply system to supply fluid to fluid applicator modules, the fluid supply system comprising:
 - the fluid applicator modules to apply fluid onto media; and
 - a fluid applicator mounting device to receive the fluid applicator modules, the fluid applicator mounting device including:
 - a main body including a common fluid channel therein having a main input port to receive fluid from a fluid reservoir, a main output port to return fluid to the fluid reservoir, and supplemental port sets corresponding to the fluid applicator modules, respectively;
 - each supplemental port set including a supplemental input port to provide fluid to the corresponding fluid applicator module and a supplemental output port to output fluid from the corresponding fluid applicator module;
 - input fin members disposed in the common fluid channel, each input fin member is arranged proximate to a corresponding supplemental input port to guide fluid to the respective fluid applicator module; and
 - output fin members disposed in the common fluid channel, each output fin member is arranged proximate to a corresponding supplemental output port to guide fluid from the respective fluid applicator module away from the corresponding supplemental output port.
7. The fluid supply system according to claim 6, wherein the fluid applicator modules comprise printhead modules.

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8. The fluid supply system according to claim 7, wherein fluid is continuously transported between the fluid reservoir, the common fluid channel, and the fluid applicator modules.

9. The fluid supply system according to claim 6, further comprising:

- a fin carrier member coupled to the input fin members and the output fin members extending outward from the fin carrier member to form a single fin unit, wherein the single fin unit is removeably disposed inside the common fluid channel.

10. The fluid supply system according to claim 6, further comprising:

- a plurality of walls intersecting with each other to form the common fluid channel having a channel height and a channel width; and
- wherein the input fin members and the output fin members have a fin height less than the channel height and a fin width less than the channel width.

11. The fluid system according to claim 10, wherein the input fin members and the output fin members are arranged substantially perpendicular to at least one of the walls.

12. A method of supplying fluid to fluid applicator modules, the method comprising:

- supplying fluid from a fluid reservoir to a common fluid channel of a main body of a fluid applicator mounting device;

- guiding fluid in the common fluid channel into supplemental input ports by respective input fin members arranged proximate to corresponding supplemental input ports corresponding to respective fluid applicator modules mounted on the main body of the fluid applicator mounting device;

- guiding fluid output from the respective fluid applicator modules through supplemental output ports into the common fluid channel and away from the supplemental output ports by respective output fin members arranged proximate to the corresponding supplemental output ports; and

- returning the fluid output through the supplemental output ports from the respective fluid applicator modules into the common fluid channel to the fluid reservoir.

13. The method according to claim 12, wherein fluid is continuously transported between the fluid reservoir, the common fluid channel, and the fluid applicator modules.

14. The method according to claim 12, wherein:

- the common fluid channel is formed by a plurality of walls intersecting with each other such that the common fluid channel has a channel height and a channel width; and
- the input fin members and the output fin members have a fin height less than the channel height, a fin width less than the channel width, and are arranged substantially perpendicular to the plurality of walls.

15. The method according to claim 12, wherein the fluid applicator modules comprise printhead modules.

16. The fluid applicator mounting device according to claim 1, wherein a fin member is perpendicular to a direction of fluid flow in the common fluid channel.

17. The fluid applicator mounting device according to claim 1, wherein a fin member is circular.

18. The fluid applicator mounting device according to claim 1, wherein an input fin member is downstream of the corresponding supplemental input port and an output fin member is downstream of the corresponding supplemental output port.

19. The fluid applicator mounting device according to claim 1, wherein a fin member is projected from a fin carrier member on an arm, the arm having a dimension smaller than the fin member.

20. The fluid applicator mounting device according to claim 1, wherein an area of a fin member corresponds to an area of the corresponding port.

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